

BTEC Assignment Brief

Qualification	Pearson BTEC International Level 3 Foundation Diploma in Engineering Pearson BTEC International Level 3 Diploma in Engineering Pearson BTEC International Level 3 Diploma in Electrical/Electronic Engineering Pearson BTEC International Level 3 Diploma in Mechanical Engineering Pearson BTEC International Level 3 Diploma in Digital Engineering Pearson BTEC International Level 3 Diploma in Manufacturing Engineering Pearson BTEC International Level 3 Extended Diploma in Engineering Pearson BTEC International Level 3 Extended Diploma in Electrical/Electronic Engineering Pearson BTEC International Level 3 Extended Diploma in Mechanical Engineering Pearson BTEC International Level 3 Extended Diploma in Digital Engineering Pearson BTEC International Level 3 Extended Diploma in Manufacturing Engineering
Unit number and title	Unit 27: Static Mechanical Principles in Practice
Learning aim(s)	A: Examine how the forces acting in pin-jointed framed structures influence their structural integrity
Assignment title	Pin jointed frames structures.
Assessor	
Issue date	
Hand in deadline	

Vocational Scenario or Context	You are a second year technical apprentice in a large manufacturing company producing structural members that are used in a new construction project. Your supervisor has asked you to carry out some experiments to find out how beams react to different types of loading, and then to perform a number of calculations to confirm the findings of the experiments. The experiments and calculations relate to pin-jointed framed structure.
Task 1	You need to produce a report that demonstrates analytical and practical skills and use these to explain the effects of loads on pin-jointed frames, suggesting improvements to the structures. To do this: Your tutor will provide you with a diagram that shows a framework with at least 12 members that are supported on one side by a pin-joint and on the other side a roller. You need to: Complete checks to find the support reactions, and establish that the framework is stable and statically determinate. Also, prepare using a suitable scale and

	annotation a space diagram for the framework. • Use (1) the method of sections, (2) graphical methods (including calculations) and (3) analytical methods to determine support reactions and primary forces in the central members of a pin jointed structure. • Evaluate the three different techniques you have used to justify the most appropriate methods of finding the forces in the central members of the pin jointed structure.
Checklist of evidence required	A report containing graphical and mathematical modelling relating to the analysis of given pin-jointed structures.
Criteria covered by this task:	
Unit/Criteria reference	To achieve the criteria you must show that you are able to:
27/A.D1	Demonstrate accurately the most appropriate method for finding the forces in the central members of a pin-jointed framed structure, justifying the rationale.
27/A.M1	Determine accurately the magnitude and nature of the primary forces acting in the components of a pin-jointed, statically determinate framed structure.
27/A.P1	Determine graphically the support reactions and primary forces acting in the members of a pin-jointed, statically determinate framed structure.
27/A.P2	Calculate the support reactions and primary forces acting in the components of a pin-jointed, statically determinate framed structure.
Sources of information to support you with this Assignment	Books Andrew Buckenham, Gareth Thomson, Natalie Griffiths, Steve Singleton, Alan Serplus, Michael Ryan (2016) BTEC Nationals in Engineering, Pearson, ISBN 9781292141008 Boyce A., Cooke E., Jones R., Mantovani B., Roberts D., Weatherill B., (2010) BTEC Level 3 National Engineering Student Book (Level 3 BTEC National Engineering), Pearson Educational, ISBN 978 1 84690 754 1 Tooley M. and Dingle L. (2010) BTEC National Engineering, Elsevier, ISBN 978 0 12 382202 4 Websites thelearningpoint.net/home/engineering-mechanics/analysis-of-structures educationscotland.gov.uk/images/8083det2_tcm4-117154.doc
Other assessment materials attached to this Assignment Brief	A diagram of a framework with at least 12 members that are supported on one side by a pin-joint and on the other side a roller.